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VEGETABLE RESEARCH RESULTS 2005

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INTRODUCTION

This report summarizes the results of several vegetable studies conducted during 2005. We hope that this type of information is of benefit to the vegetable industry in Ohio and the Great Lakes region. Your comments and suggestions for future efforts are always welcome.

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- *The Ohio Vegetable and Small Fruit Research and Development Program*
- *Mid-America Food Processors Association*
- *OARDC Competitive Grants Program*

Appreciation is extended to those who provided seed, transplants, or other supplies for these projects:

- *Valent BioSciences*
- *Seedway*

Special thanks and appreciation to Sean Mueller, Stan Gahn and the crew at the OARDC North Central Agricultural Research Station, Fremont, OH, and to volunteer Emily Calvert for their assistance with crop maintenance, harvesting and grading.

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Sweet Corn Seed Treatment and Seedling Establishment Trial – 2005

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Objective:
Twelve seed treatment combinations plus an untreated control were tested on two cultivars of sweet corn (*sh₂* 'Krispy King' and *se* 'Luscious') to determine the best seed treatments for optimum stand establishment.

Materials and Methods:
Plots were established at the North Central Agricultural Research Station (NCARS) near Fremont, Ohio on May 9, 2005. Four replications of 100 seeds were planted in rows spaced 30" apart with 4-5" between seeds. Each cultivar was planted in a randomized block design. Soil type was Rimer loamy fine sand. Soil temperature (2" depth) at planting was 50°F. When plants reached at least the 5-6 leaf stage stand counts were taken (June 15) to determine effective seed treatments for optimum sweet corn stand establishment.

Results and Discussion:
Emergence of the *se* cultivar 'Luscious' was lowest in the untreated check plots and two biological/organic seed treatments (GB 34 and Natural II). All other seed treatment combinations resulted in significantly higher emergence values. The emergence range in Fremont was 48% to 83% (Table 1).

Emergence of the *sh2* cultivar 'Krispy King' was 62% or less in the untreated check plots and the GB 34 plots. Only 3 seed treatment combinations had a significantly higher emergence than the untreated check (Table 1). Emergence of 'Krispy King' ranged from 59% to 84%.

This project was part of a multi-location trial organized by the Seed Treatment Committee of the International Sweet Corn Development Association, a non-profit research organization. The information generated from this study will be of value to sweet corn producers, industry personnel, consultants, farm advisers, extension plant pathologists and others interested in identifying the best performing seed treatments for optimum stand establishment.

Acknowledgements:
We would like to thank the *Ohio Vegetable and Small Fruit Research and Development Program* for their financial support of this research.

Table 1. Sweet Corn Seed Treatment and Seedling Establishment-2005, Fremont, OH.

		% Stand	
Seed Treatment	**Rate**	**se: 'Luscious'**	**sh2: 'Krispy King'**
Untreated Check		52	62
Captan 400	3.00 fl oz/cwt	72	67
Thiram 42S	2.50 fl oz/cwt		
Allegiance FL	0.75 fl oz/cwt		
Captan 400	3.00 fl oz/cwt	71	75
Thiram 42S	2.50 fl oz/cwt		
Allegiance FL	0.75 fl oz/cwt		
Topsin 30	5.00 fl oz/cwt		
L0052	3.00 fl oz/cwt	70	68
L1226	15.00 g/cwt		
L1028	1.25 g/cwt		
Allegiance FL	0.75 fl oz/cwt		
Captan 400	3.00 fl oz/cwt	72	72
Thiram 42S	2.50 fl oz/cwt		
Allegiance FL	0.75 fl oz/cwt		
L1217	5.00 g a.I./100 kg		
L1243	109.00 g/cwt	75	67
L1226	10.00 g/cwt		
Allegiance FL	0.75 fl oz/cwt		
GB 34 (Biological/Organic)	0.05 oz/cwt	48	59
Apron XL 3 LS	0.19 fl oz/cwt	72	65
Maxim 4 FS	0.08 fl oz/cwt		
Dividend Xtreme 0.96 FS	2.00 fl oz/cwt		
Maxim 4 FS	0.08 fl oz/cwt	74	66
Apron XL 3 LS	0.31 fl oz/cwt		
Dynasty 0.83 FS	0.15 fl oz/cwt		
Apron XL 3 LS	0.19 fl oz/cwt	83	83
Dynasty 0.83 FS	0.15 fl oz/cwt		
Maxim 4 FS	0.08 fl oz/cwt		
Dividend Xtreme 0.96 FS	2.00 fl oz/cwt		
Cruser 5 FS	0.25 mg/seed		
A14115A	0.139 mg/seed	78	84
Apron XL 3 LS	0.23 fl oz/cwt		
Cruiser 5 FS	0.125 mg/seed		
Apron XL 3 LS	0.104 fl oz/cwt	81	82
A14155A	0.139 mg/seed		
Dividend Xtreme 0.96 FS	2.00 fl oz/cwt		
Cruiser 5 FS	0.125 mg/seed		
Natural II (Biological/Organic)	3.2 oz/cwt	55	66
LSD(0.05)		15.0	13.6
CV		20.3	16.2

Fresh Market Plum Tomato Germplasm Evaluation - 2005

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OARDC North Central Agricultural Research Station, Fremont, OH

Introduction: Plum tomatoes, once grown primarily for processing, are becoming more popular in the fresh market sector. New and old varieties, providing a variety of colors, were tested under northern Ohio growing conditions.

Objectives: To test fresh market plum cultivars grown on raised beds using black plastic mulch and trickle irrigation in northwest Ohio for marketable yields, average fruit size and fruit characteristics.

Materials and Methods: Twelve cultivars of plum tomatoes were seeded into 200-cell plug trays on April 12, 2005, and grown to maturity in the greenhouse at the OARDC North Central Agricultural Research Station (NCARS) in Fremont, Ohio. Transplants were established in the field at NCARS on May 26, 2005 into raised beds with black plastic mulch and trickle irrigation. Raised beds were spaced 5 feet apart and plants were spaced 18 inches apart within the rows. Each cultivar was replicated 4 times. Drip irrigation was applied as needed throughout the growing season. Fruit was harvested two times on August 18 and September 6.

Results and Discussion: Yields ranged from 15.0 to 34.8 T/A for marketable fruit (Table 1). Top yielding varieties include Health Kick, Murial, Daquiri, BHN 411 and BHN 410. The lowest yielding variety was Debarao, mainly due to the small fruit size. The only yellow variety, Golden Milano, had inconsistent fruit shape and size. Largest average fruit size was obtained with Murial, Mariana, Plum Crimson, and BHN 410. As new varieties become available for fresh market staked and plum tomatoes, variety evaluations provide valuable information on yield potential, fruit characteristics and disease problems. Yield results from both locations and photos of plum cultivars tested will be available winter 2005 via the OSU VegNet website at www.vegnet.osu.edu.

Acknowledgements:

- Sincere thanks and appreciated to the *Ohio Vegetable Small Fruit Research and Development Program* for their financial support of this project.
- Thanks to *Sean Mueller, Stan Gahn and the summer crew at NCARS* for their assistance with the plum tomato evaluation.
- Our thanks and appreciation is extended to *Seedway* for their seed donations for this project.
- Thanks and appreciation *to Emily Calvert* for numerous volunteer hours assisting with plum tomato fruit harvesting and grading.

Table 1. Plum tomato germplasm evaluation, 2005.

Cultivar	**Seed Source**	**Red T/A**	**Cull T/A**	**Avg. fruit size (lbs)**	**Comments**
Lunchbox	Stokes	24.4	0.8	.07	Similar to a large cherry tomato in size
Health Kick	Stokes	34.8	1.9	.16	Highest yielding
Golden Milano	Stokes	28.9	2.3	.14	Inconsistent shape & size
Debarao	Johnny's	15.0	2.8	.12	Small plum, inconsistent shape
Daquiri	Stokes	32.1	2.4	.14	Medium fruit size; good shape
San Marzano	Ferry Morse	23.4	2.4	.09	Pear shape; inconsistent size and shape
BHN 410	Seedway	30.8	1.9	.18	Uniform shape & size
BHN 411	Seedway	31.3	1.6	.18	Uniform shape & size
Mariana	Seedway	29.8	1.8	.23	Uniformly large, plum shaped fruit
Hybrid 882	Seedway	28.4	1.8	.17	Uniform shape & size
Plum Crimson	Seedway	28.1	3.2	.19	Large plum shape
Murial	Seedway	32.6	3.2	.26	2nd highest yielding; consistently uniform size; plum shape
LSD (0.05)		**NS**	**NS**	**.05**	
C.V.		**37.4**	**54.8**	**36.4**	

Effect of Plug Tray Size and Copper-Treated Containers for Processing Tomato Transplant Production – 2005

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Objective(s) of research:

Processing tomato fruit maturity depends on several factors such as growing conditions, cultivar selection, and transplant field establishment/survival. Plug tray cell size (and volume) may also affect final yield as well as earliness. This study compared 3 cell sizes and two cultivars of processing tomatoes to determine the effect of cell size on processing tomato seedling development, maturity and earliness. We also included copper treated containers/plug trays of each size along with untreated checks to determine its effect on transplant survival, plant growth, and yield. Copper treatment has been shown to produce a more uniformly developed root ball mass in tree seedling production versus untreated containers which promote more circling of roots.

Materials and Methods:

Processing tomatoes 'OX 150' and 'RG 611' were seeded into three sizes of plug trays (200, 338 and 406) which were treated with copper paint (Spin-Out). Untreated controls of each plug tray size for the two varieties were also seeded on April 26, 2005. Plants were grown at the NCARS greenhouse using standard transplant production protocols. Plants were transplanted to the field into raised beds on June 1. Plants were spaced 1 foot apart with raised beds spaced 5 feet apart. Plants were grown using standard pesticide applications. Tomatoes were harvested on September 13 using a mechanical harvester. Data for marketable red, greens, culls and average fruit size, and percent red fruit at harvest was recorded.

Results and Discussion:

Main effects show that cultivar had a significant effect on green T/A and average fruit size at the 0.05 probability level. Cultivar also had a significant effect on cull T/A and percent red fruit at harvest at the 0.001 probability level. The main effect of cell size was significant for red T/A at the 0.01 probability level. Copper treatment effect or combinations of main effects did not influence the variables we measured in 2005 (Table 1).

Highest red T/A for 'OX 150' was obtained when using transplants grown in 406-cell plug trays regardless of whether or not copper treatment was applied. Highest yields for 'RG611' was obtained with copper treated 406 plug tray plants and with the 200 cell plug trays untreated. Cultivar and cell size were the two main factors that influenced yield.

Overall, ‘RG 611’ had a higher percent of red fruit at harvest (77-85%) compared to ‘OX 150’ (64-74%).

Future research should include investigating (1) smaller cell sizes (512, other?), and (2) copper treated containers for several cultivars to determine their effect on marketable yield, average fruit size, and percent red fruit at harvest.

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We would like to thank the *Mid-America Food Processors Association* for their financial support of this project.

Table 1. Copper Treated/Cell Size Study on Processing Tomatoes - 2005

NCARS, Fremont, OH

	Red T/A	Green T/A	Cull T/A	Avg. fruit size size (lb.)	Percent red fruit at harvest
CV	NS	*	***	*	***
Cell Size	**	NS	NS	NS	NS
Copper	NS	NS	NS	NS	NS
CV*Cell Size	NS	NS	NS	NS	NS
CV * Copper	NS	NS	NS	NS	NS
Cell Size*Copper	NS	NS	NS	NS	NS
CV*Cell Size*Copper	NS	NS	NS	NS	NS

*, **, *** = significant at the 0.05, 0.01, and 0.001 probability levels, respectively.

Cultivar	Cell Size	Copper trt	Red T/A	Green T/A	Cull T/A	Avg. fruit size (lb.)	Percent red at harvest
OX 150	200	yes	28.4	4.2	7.0	0.12	72
OX 150	200	no	28.0	3.4	8.3	0.12	70
OX 150	338	yes	29.5	5.2	6.3	0.13	72
OX 150	338	no	24.1	4.0	9.7	0.13	64
OX 150	406	yes	30.6	3.7	7.2	0.13	74
OX 150	406	no	32.8	3.5	8.2	0.12	74
RG 611	200	yes	26.7	2.2	3.8	0.13	82
RG 611	200	no	29.5	1.8	4.7	0.13	82
RG 611	338	yes	26.3	3.5	4.4	0.14	77
RG 611	338	no	26.5	1.2	4.9	0.13	81
RG 611	406	yes	30.8	1.6	3.9	0.13	85
RG 611	406	no	29.4	1.9	5.0	0.13	81

Copper-Treated Containers for Vegetable Transplant Production – 2005

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Objective: To investigate the use of copper-treated plug trays to promote a more uniform root system and improved field establishment and increased yields for cucurbit vegetable transplants.

Materials and Methods: 'Spin-Out', a copper paint treatment, was applied to the inside of 50-cell plug trays with a sponge brush on April 12. Muskmelon ('Nitro') and butternut squash ('Waltham') were seeded into the flats on May 9 along with untreated controls and grown in the greenhouse at the OARDC North Central Agricultural Research Station (NCARS) in Fremont, OH. There were no differences in seed germination in the treated and untreated trays for both crops. Plants were transplanted to the field on June 1. Plants were spaced 3 feet apart with rows spaced 7.5 feet apart on bare ground. Melons were harvested on August 9 and squash was harvested on September 12.

Results and Discussion: Copper-treated trays showed a trend for increased yields compared to the untreated control in both the melon and squash. Average fruit size was the same for both treated and untreated plots for both crops. Marketable yields for muskmelon with the copper treatment were 15.3 T/A compared to 13.6 T/A for the untreated control. Squash marketable yields with the copper treatment were 33.9 T/A compared to 28.8 T/A for the untreated controls (Table 1).

'Spin Out' has been used in the past for tree seedling establishment and looks promising in the 2005 preliminary results on both muskmelons and squash. Other cucurbit species should be tested to determine if similar results are seen with the use of copper paint.

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for their financial support of this project

Table 1. Copper treated plug containers for vegetable transplant production – 2005.

Muskmelon 'Nitro'			
Treatment	**T/A**	**Fruit number/A**	**Average fruit size (lbs)**
Untreated control	13.6	3949	6.7
Copper treatment	15.3	4472	6.7
LSD(0.05)	NS	NS	NS
CV	36.1	35.3	6.0
Butternut Squash 'Waltham'			
Treatment	**T/A**	**Fruit number/A**	**Average fruit size (lbs)**
Untreated control	28.8	16378	3.5
Copper treatment	33.9	19805	3.5
LSD (0.05)	NS	NS	NS
CV	29.9	30.8	6.1

Light and temperature interactions in promoting lettuce seed germination

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Introduction

Lettuce is one of the most important vegetables grown in North America. Its establishment in the field is performed mainly by direct sowing, and uniform seedling emergence is critical to achieve high yield. However, there are two properties of lettuce seeds that affect germination uniformity: i) germination inhibition in dark, and ii) sensitivity to high temperatures (thermodormancy) (Wien, 1997). The objective of this work was to determine the effects of temperature, light and their interaction in promoting lettuce seed germination.

Materials and Methods

Lettuce seed (*Lactuca sativa* L. cv. 'Tango'), produced under greenhouse conditions at Columbus, OH, during summer 2004, was used. Seed germination (radicle emergence 5 days after sowing) was evaluated under different treatments which are grouped in two experiments.

Experiment 1. Treatments consisted of germination under dark conditions, with or without a light break (red light, 28.8 mmol·m-2) 48 h after sowing, and of different combinations of temperatures pre- (soaking temperature, ST) and post- (germination temperature, GT) light break. In addition, germination with continuous light at 20 and 30°C was also evaluated. Each treatment was repeated 3 times. Each replication consisted of 4 petri dishes, each one with 50 seeds placed over 2 blotters saturated with distilled water.

Experiment 2. Treatments were similar to those in experiment 1 but with different combinations of temperatures (ST and GT). With the use of a thermogradient table, temperatures between 12 and 30°C were incorporated to the treatments. Each treatment was repeated 4 times. Each replication consisted of a petri dish with 50 seeds placed over 3 blotters saturated with distilled water.

Results and Discussion

Under continuous light, lettuce seed presented 100 and 96% germination at 20 and 30°C, respectively (Fig. 1). However, when no light was supplied, germination decreased drastically to less than 5% (Fig. 1; Fig. 2a, e) unless seeds were soaked at cold (2 or 10°C) temperatures (Fig. 1; Fig. 2f, g). The efficiency of cold soaking in promoting lettuce germination was dependent of ST (2°C was more effective than 10°C) and GT (temperatures around 21.8°C presented the best response) (Fig. 2f, g).

The germination promotion of a red light break after 48 h of soaking was dependent of the ST and GT. When GT was 20°C, germination after light at any of the ST treatments was improved significantly in relation to the same combination of temperatures without light break (Fig. 1; Fig. 2c, e); germination values close to 100% were observed when ST was 14°C or lower. When GT was 30°C, germination was significantly higher than 0% only when ST was lower than 21.8°C (Fig. 1; Fig. 2d); germination was over 95% only with a ST of 10°C (Fig. 1; Fig. 2h).

Germination after a combination of cold soaking and light break was close to 100% independent of the GT (Fig. 1; Fig. 2h). Seed germination responded synergistically to cold soaking and a light break, especially at extreme GT (Fig. 2g, h, i).

In contrast to what has been observed previously with lettuce seed of other cultivars, the seed that we used exhibited a marked light requirement for germination at any of the temperatures tested (Fig. 2a). On the other hand, thermodormancy was also observed, but it was dependent of ST, GT and the amount of light. According to Saini et al. (1989), the increased light requirement at higher temperatures could be explained either by higher instability of the activated form of phytochrome (Pfr), or by decreasing sensitivity to Pfr. Because of the high germination observed after a light break applied to cold-soaked seeds (Fig. 1; Fig. 2h), our results support the idea that low soaking temperatures may increase sensitivity to Pfr, reversing effects of high GT. Additionally, Hallet and Bewley (2002) suggested that a component of the phytochrome signal transduction pathway would be membrane linked, and temperature would modulate this pathway by affecting membrane fluidity. Higher membrane fluidity by increased acyl chain saturation of membrane lipids could partially explain the improved germination observed after cold soaking of seeds.

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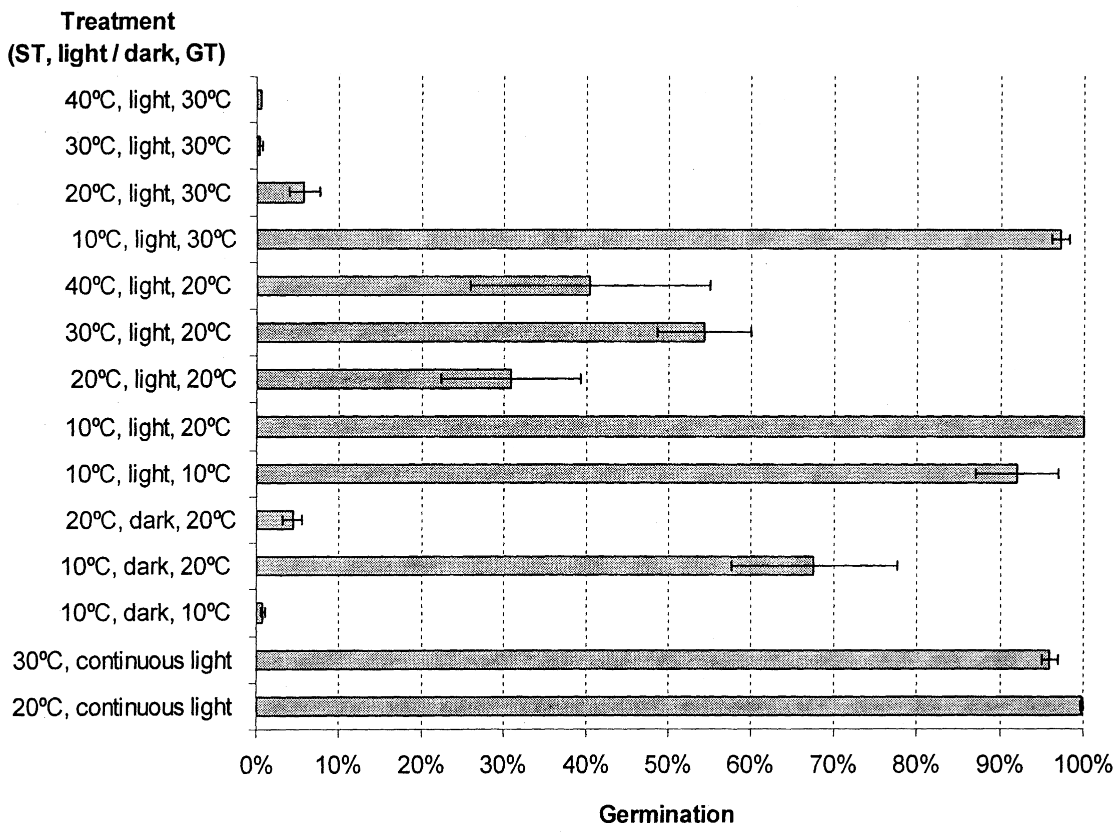

Figure 1. Lettuce seed germination after 5 days under different conditions of light and temperature. Unless otherwise stated, treatments consisted of 48 h in dark at soaking temperature (ST), a light break that could be present ("light") or not ("dark"), and 72 h in dark at germination temperature (GT). In treatments with "continuous light", seeds were evaluated after 5 days at constant temperature and constant light. Data are means ± SE.

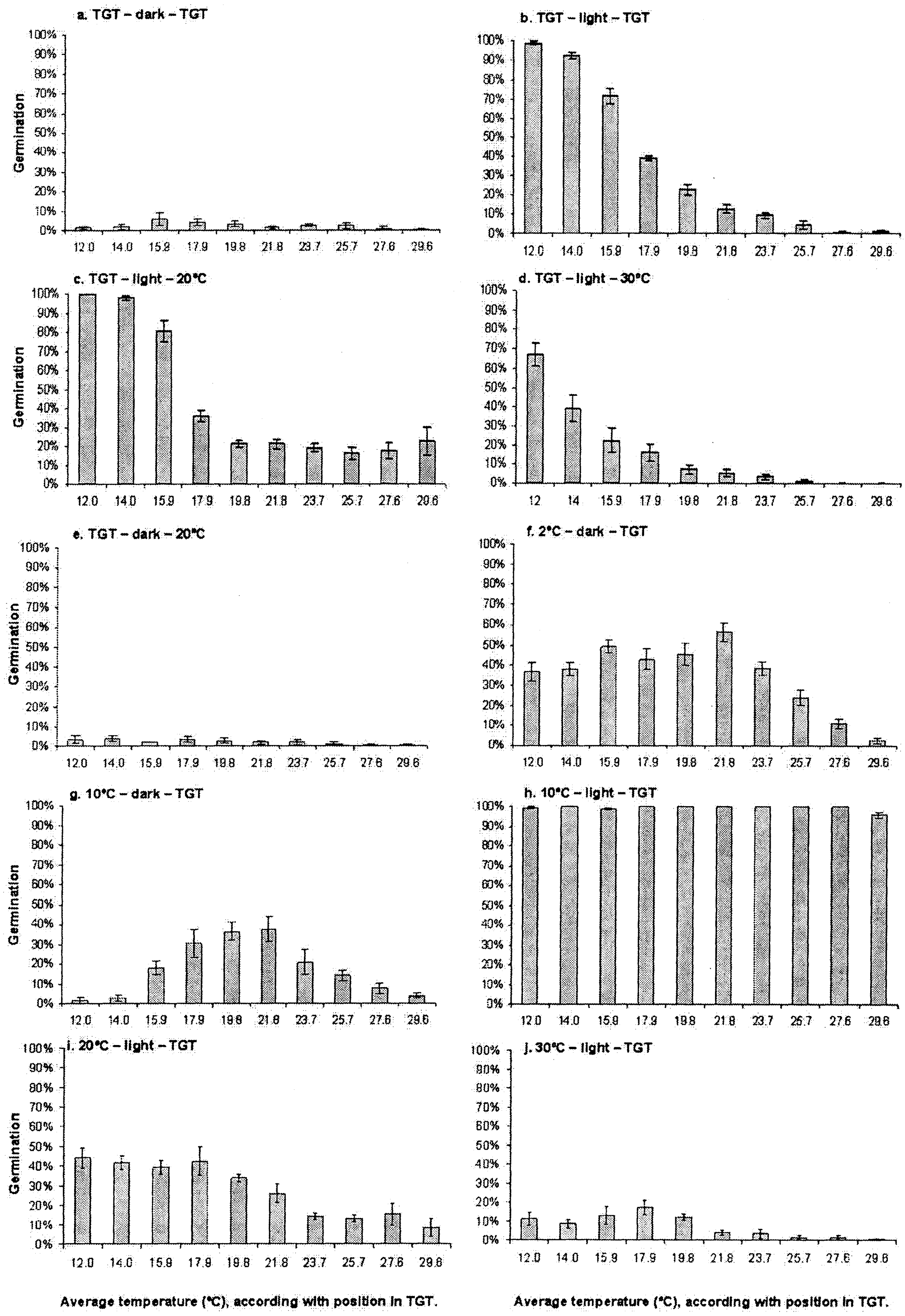

Figure 2. Lettuce seed germination after 5 days under different conditions of light and temperature. Treatments consisted of 48 h in dark at soaking temperature (ST), a light break that could be present ("light") or not ("dark"), and 72 h in dark at germination temperature (GT). In all cases, at least one of the temperatures (ST, GT, or both) was determined by the position of the seeds in a thermogradient table (TGT), which presented temperatures between 12.0 and 29.6°C. Data are means ± SE.

On-Farm Management Strategies For Holding Vegetable Transplants When Planting Is Delayed Due To Adverse Weather/Field Conditions

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Objectives: to investigate strategies for holding vegetable transplants in the spring due to delayed planting in the field. Hardening periods of 0, 3, 5, and 10 days were investigated to determine any differences in final marketable yields of tomatoes and cabbage. Use of abscisic acid (ABA) was also investigated in a greenhouse study to see its effect on controlling vegetable transplant height.

Materials and Methods: Tomato ('P696') and cabbage ('China Dynasty') transplants were seeded into 288 cell plug trays on April 12. Plants were grown in the NCARS greenhouse in Fremont, Ohio. Plants were hardened off for 0, 3, 5, or 10 days prior to transplanting to the field on May 31. Hardening off conditions consisted of placing plug trays on a flat bed wagon under a covered storage building. All treatments were planted in 4 replications. Standard pesticide applications were applied throughout the growing season. Tomatoes were mechanically harvested on September 12 and cabbage was harvested on September 6. There were no differences in marketable yield, average fruit size or percent red fruit in tomatoes for any of the holding times prior to transplanting (Table 1). There were no differences in yield, average head weight or head measurements for cabbage (Table 2).

A preliminary greenhouse study using ABA on tomatoes for height control was also conducted. Tomatoes ('P696') were seeded into 200 cell plug trays. After six weeks, ABA was applied at 200 ppm and 400 ppm along with an untreated control. Plants were measured after 12 days, placed under shade cloth and measured again after 5 days. Preliminary results show ABA reduced plant height when applied at both rates of 200 and 400 ppm (Table 1). Studies will be proposed for 2006 to investigate the use of ABA on tomato and/or other vegetable transplants for any effect on crop development and final yield.

Fall cabbage transplants treated with 200 ppm ABA and an untreated control were transplanted into raised beds at NCARS on September 12. Plants will be harvested in late fall, 2005.

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Table 1. On-Farm Management Strategies for Holding Vegetable Transplants When Planting is Delayed Due to Adverse Weather/Field Conditions - 2005

Tomatoes 'P696'

Holding time before transplant (days)	Red T/A	Green T/A	Culls T/A	Average fruit size (lbs)	Percent red fruit
0	39.6	6.2	5.1	0.14	89
3	39.1	6.2	5.1	0.14	89
5	40.5	5.8	6.4	0.14	89
10	38.9	6.2	6.2	0.13	88
LSD (0.05)	NS	NS	NS	NS	NS
CV	14.4	49.9	47.4	14.2	3.2

Greenhouse Study Using ABA on 'P696' Tomatoes

	-----------------12 days after ABA treatment-----------------					---After 5 days of hardening under shade cloth---- -----------------17 days after ABA treatment-----------------				
Treatment	Plant ht (cm)	Stem diam (mm)	Leaf Area (cm2)	Fresh wt. (g)	Dry wt. (g)	Plant ht (cm)	Stem diam (mm)	Leaf Area (cm2)	Fresh wt. (g)	Dry wt. (g)
Control	17.3	2.1	102.2	6.2	0.72	22.2	2.3	139.8	8.2	0.95
200 ppm ABA	12.4	1.9	75.5	4.4	0.51	14.9	2.1	103.3	5.8	0.64
400 ppm ABA	11.6	2.1	55.0	3.4	0.37	13.3	2.3	86.5	4.7	0.47
LSD (0.05)	1.75	NS	14.53	0.89	0.19	1.89	NS	23.72	1.63	0.21
CV	24.7	5.2	29.8	31.3	37.9	32.3	4.7	26.6	32.2	40.1

Table 2. Cabbage Holding Study 2005
Bennett, NCARS

China Dynasty'

Holding time (days)	Marketable T/A	Cull T/A	Average head wt (lbs)	Core length (in)	Equitoral (in)	Polar (in)
0	16.3	0.5	4.0	3.1	6.3	7.7
3	17.2	0.0	3.9	2.9	6.3	7.5
5	16.0	1.2	4.1	3.2	6.2	7.8
10	16.4	0.5	3.9	2.9	6.2	7.5
LSD(0.05)	NS	NS	NS	NS	NS	NS
CV	8.6	16.5	10.4	12.8	5.2	6

Evaluation of Specialty Vegetable Crops and New Cultivars – 2005

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Objectives:

1). To test five specialty crops in Ohio for yield and fruit/plant characteristics.

2). To test six newly released cultivars to evaluate fruit characteristics and yield potential under Ohio growing conditions.

Methods and Materials:

The following five specialty crops were tested at the North Central Agricultural Research Station (NCARS), in Fremont Ohio:

'Cosmic Purple' carrots
'Atomic Red' carrots
'Burpee Golden' beets
'Sancho' specialty melon
'Visa' specialty melon

Carrots and beets were direct seeded on May 12 into raised beds measuring 6 feet in length. Each crop was replicated 3 times. Seedlings were thinned on June 15. Carrots were harvested twice on July 19 and and August 9. Beets were harvested three times on July 19, July 26 and August 9.

Specialty melons ('Visa' and 'Sancho') were seeded on May 9 into 50-cell plug trays. Pumpkins and melons were established in the field on June 1 into flat ground with black plastic mulch. Rows were spaced 7.5 feet apart with in row plant spacing of 3 feet.

The following new cultivar releases were also tested at NCARS during the 2005 growing season:

'Orange Blossom' tomato
'Alliance' bell pepper
'One Ball' summer squash
'Jet' acorn squash
'Red Warty' specialty pumpkin
'Eight Ball' summer squash

Tomato and bell pepper cultivars were seeded into 200-cell plug trays on April 12. They were established in the field on May 26 into raised beds with black plastic mulch and trickle irrigation. Rows were spaced 5 feet apart with in-row plant spacing of 18 inches. Tomatoes were harvested twice on August 9 and 18. Peppers were harvested twice on August 19 and September 6.

Pumpkin and squash varieties were seeded on May 9 into 50-cell plug trays. They were established in the field on June 1 into flat ground with black plastic mulch. Rows were spaced 7.5 feet apart with in-row plant spacing of 3 feet. Summer squash varieties were harvested three times on July 13, 19 and 25. Acorn squash and pumpkins were harvested on September 12.

Results and Discussion:

New /Specialty Crops (Table 1)

'Cosmic Purple': this specialty carrot has a true purple color. Would be a nice addition for sales to specialty markets or restaurants. Average yield from 6 feet of row was 56 carrots weighing 7.8 lbs. Weight includes carrots with tops intact. Average length of carrots at harvest were 7-9 inches. Only a few of the carrots harvested were forked or twisted.

'Atomic Red': this cultivar was more orange in color than red. The red color seems to develop when the carrots are larger. Average yield from 6 feet of row was 31 carrots weighing 3.6 lbs, including tops. More twisted and forked carrots were harvested compared to the 'Cosmic Purple' cultivar. Average length at harvest was 6-8 inches. If you are interested in a dark red carrot, perhaps another cultivar may have better color development.

'Burpee Golden': this bright golden specialty beet is unique for specialty markets and restaurant sales. Beets retain their bright gold color after cooking. Average yield from 6 feet of row was 32 beets weighing 9 lbs (with tops attached). No culled beets were harvested from any of the reps. Good cultivar for niche market sales.

'Sancho': this specialty melon has unique dark green and yellow speckled skin with a white interior. Marketable yield was 4.9 T/A and average fruit size was 7 lbs. Excellent flavor. Plots had heavy bacterial wilt pressure.

'Visa': this melon is round, netted skin and sweet, green flesh. Marketable yield was 2.2 T/A with an average fruit size of 3.7 lbs. Heavy bacterial wilt throughout the plots.

New Cultivars (Table 2)

'Orange Blossom': this round bright orange tomato has an average fruit size of .37 lbs. Marketable yield was 24.1 T/A. Consistent fruit size.

'Alliance' bell pepper: this 3 and 4 lobed pepper matures from green to red. Fruits are blocky with thick walls. Marketable yield was 11.5 T/A with 1 T/A culled fruits.

'One Ball' summer squash: this unique, round squash is bright yellow with a green star pattern at the stem end. Average fruit weight was 0.8 lbs. Total marketable yield was 10 T/A with no culled fruit from any harvests. This unique cultivar would be excellent for niche or restaurant sales and is suitable for grilling, baking or stuffing. Caution should be taken when harvested, as fruit will not easily twist from the plant so cutting from the plant is required. Matures in 35 days.

'Eight Ball' summer squash: this small round squash is dark green and similar in size to 'One Ball'. Total marketable yield was 14.9 T/A. No culled fruits from the three harvests. As with all summer squash, frequent harvests are needed due to fast fruit development. This variety needs to be cut from the plant at harvest, as the stems are very corky and cannot be removed by twisting. Nice compliment to other summer squash. Matures in 35 days.

'Jet' acorn squash: this acorn squash has an average fruit size of 2.2 lbs and total marketable yield was 14.9 T/A. Consistent fruit size and shape throughout all replications. Semi-bush plant type and matures in 85 days.

'Red Warty' specialty pumpkin: this unusual, eye-catching pumpkin is bright orange to red with a warted surface. Average fruit size was 17.4 lbs with fruits ranging in size from 2.9 to 48 lbs. Marketable yield was 16.1 T/A, with no culled fruits. Nice addition to other fall items such as pumpkins and gourds. Good roadside market item.

Table 1. New/specialty crops tested at NCARS, 2005.

Crop	Cultivar	Seed Source	Marketable Yield	Culls
Carrot	'Cosmic Purple	Johnny's	7.8 lbs (from 6' row)	0.7 lbs
Carrot	'Atomic Red'	Johnny's	3.6 lbs (from 6' row)	2.5 lbs
Beet	'Burpee Golden'	Stokes	9 lbs (from 6' row)	0 lbs
Specialty melon	'Sancho'	Seedway	4.9 T/A	0.5 T/A
Specialty melon	'Visa'	Seedway	3.7 T/A	0.2 T/A

Table 2. New cultivars tested at NCARS, Fremont, OH, in 2005.

Crop	**Cultivar**	**Seed Source**	**Marketable T/A**	**Cull T/A**
Tomato	'Orange Blossom'	Johnny's	24.1	3.1
Bell Pepper	'Alliance	Stokes	11.9	1.0
Summer Squash	'One Ball'	Seedway	10.0	0.0
Summer Squash	'Eight Ball'	Seedway	14.9	0.0
Acorn Squash	'Jet'	Johnny's	14.9	0.5
Specialty pumpkin	'Red Warty'	Seedway	16.1 T/A	0.0

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